

## -- Draft CMARP Proposal --

### Storage and Conveyance *Clifton Court Forebay Hydrodynamics*

#### INTRODUCTION

The purpose of the monitoring program outlined below is to assist CALFED Bay-Delta Program's Comprehensive Monitoring, Assessment, and Research Program (CMARP) by describing monitoring necessary to develop, calibrate, and verify the multi-dimensional hydrodynamic model of the proposed intake structure and fish screening facility at Clifton Court Forebay (CCF). The monitoring program includes three components; collection of (1) channel cross-section data, (2) velocity data (direction and magnitude), and (3) water surface elevation data. Assembly of cross-section data (component 1) is necessary in the vicinity of the proposed intake structure and fish screening facility so that the finite element network can be sufficiently refined to represent the system on a small spatial scale. Observed hydrodynamic data including magnitude and direction of velocities and water surface elevations (components 2 and 3, respectively) collected in the vicinity of the proposed (screened) intake are compared to model simulations to determine calibration parameters including channel roughness and turbulent eddy diffusivities. Hydrodynamic data are also utilized to verify the performance of the model which can then be used as a predictive tool to investigate system response to hypothetical hydrologic and operational conditions.

Collection of hydrodynamic data is required in the vicinity of both the existing (unscreened) intake at CCF and near the Tracy Fish Collection Facility (transects 7 and 8, and transects 9 and 10, respectively). Velocity characterizations at these locations will provide insight into the conditions expected at the proposed intake, and comparisons between these data and preliminary model results of the new screen can be made.

Table 1 summarizes data required at and the general locations of each transect. Figure 1 also shows the locations of the transects with respect to Clifton Court Forebay.

Table 1. Summary monitoring program requirements

Transect	Location	Type of Measurement Required		
		Cross- Section	Velocity	Water Surface Elevation
1	North of proposed intake into CCF		X	X
2	Near proposed intake/screen facility at CCF	X	X	X
3	Near proposed intake/screen facility at CCF	X	X	X
4	Near proposed intake/screen facility at CCF	X	X	X
5	Near proposed intake/screen facility at CCF	X	X	X
6	Near proposed intake/screen facility at CCF	X	X	X
7	Near existing intake at CCF		X	
8	Near existing intake at CCF		X	
9	Near Tracy Fish Screening Facility		X	
10	Near Tracy Fish Screening Facility		X	

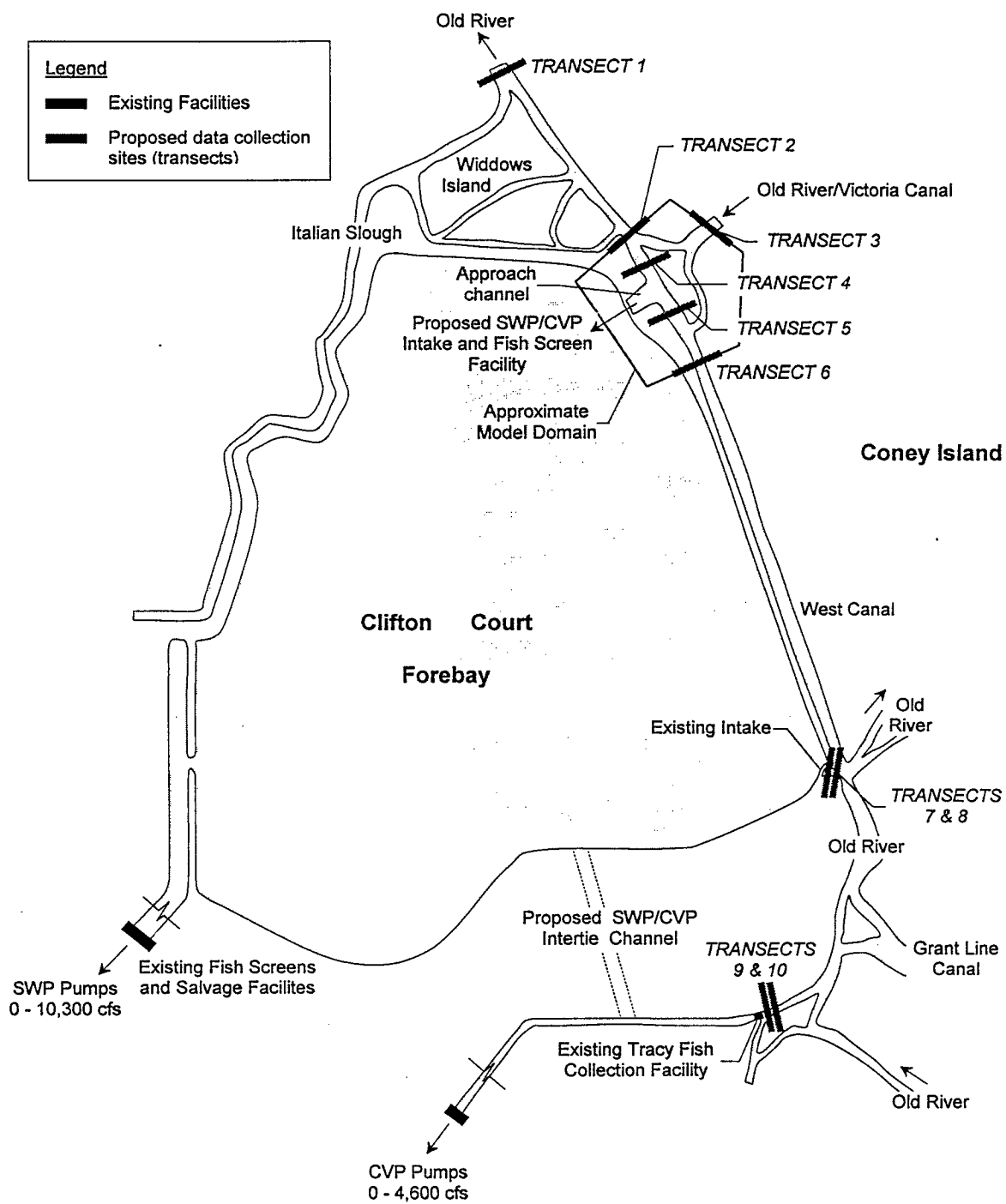


Figure 1. Clifton Court Forebay showing transects 1-10 and approximation of model domain

## MONITORING PROGRAM

The monitoring program should span various hydrologic seasons to capture extreme (wet and dry) periods. Data collected during wet and dry seasons on a monthly or bi-monthly frequency for example, can verify the applicability of the model for the widest range of conditions.

To form an initial finite element representation of the proposed screening facility, detailed geometric and cross-section information describing the approach channel (see Figure 1 for approach channel) leading to the screening facility and also of alternative screen configurations is required. Water depth, bottom width, height to top of levee, invert elevation of the gate/screen facility, and side slope of the approach channel need to be detailed.

Velocity data (direction and magnitude of the flow field) are required at Transects 1-10 (all transects). Because high resolution velocity data are required to calibrate and verify the hydrodynamic model, it is recommended that velocity measurements be recorded at intervals of approximately 50-75 ft (15-25 m) across the cross-section and at intervals of depth of approximately 10 ft (3 m) at each station within the cross-section. For a hypothetical channel that is 200 ft wide and 30 ft deep similar to that shown in Figure 2, approximately 6 velocity measurements are required. Data taken at transects 1-6 are required to develop baseline flow conditions, to form flow boundary conditions, and to determine roughness and eddy diffusivity parameters of the hydrodynamic model.

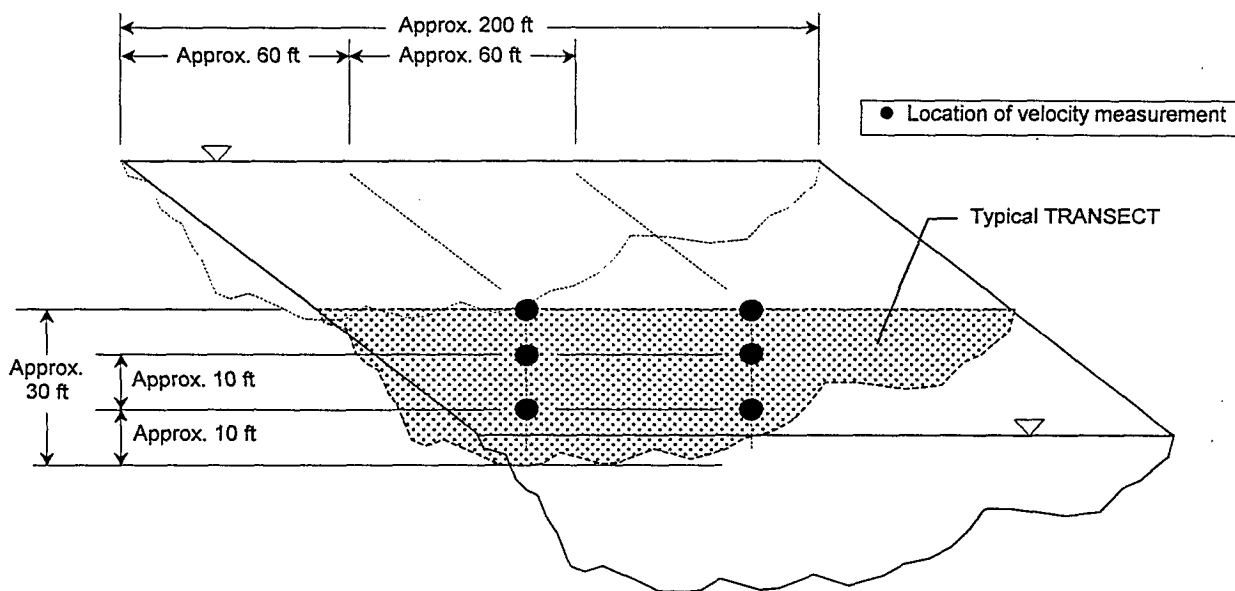


Figure 2. Cross-section showing stations across the channel and in the vertical direction at which velocity measurements are to be taken

Near the existing intake at CCF, two transects are to be taken (transects 7 and 8): one in close proximity of the intake radial gates (approximately 100-200 ft from the gates); and another farther upstream in the approach channel near West Canal (approximately 200 ft downstream of West Canal). These two transects are to be approximately 700 ft apart.

Transects 9 and 10 are to be taken in the approach channel to the Tracy Fish Facility. These transects are to be spaced similarly to transects 7 and 8. One transect should be taken approximately 100 ft from the fish screen, while the other should be taken a few hundred feet upstream.

Measurements of water surface elevations are needed to form boundary conditions and for comparison with simulation results. Model results can also be compared to observed water surface elevations in the vicinity of the proposed fish facility. Water surface elevation data are required at transects 1-6, in close proximity to the model boundaries and near the proposed intake. Both velocity and water surface elevation data should capture the range of values throughout tidal cycles (i.e., spring/neap and flood/ebb periods) at each of these transects.

#### REFERENCE

Saviz, Camilla M., X. Wang, G. T. Orlob, and I. P. King, (1998). Two-Dimensional Modeling of Hydrodynamics in the South Sacramento-San Joaquin Delta. Report 98-1, Center for Environmental and Water Resources Engineering, UC Davis.